Center Independent Research & Development: GSFC IRAD

A Reconfigurable Broadband Sensor Signal Processing Platform for Cross-Cutting Instruments (COMP-X)

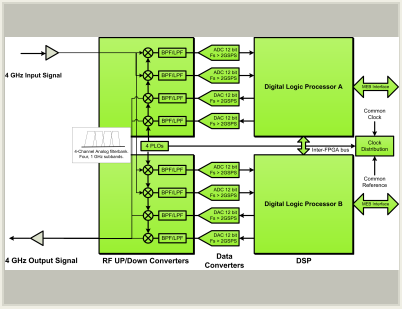
Completed Technology Project (2017 - 2018)

Project Introduction

Classes of future scientific instrumentation in the Astrophysics, Earth Science, and Planetary Science application areas share a common requirement - broadband signal readout, conversion, and processing beyond 1 billion samples per second. Many astrophysics studies currently underway in the Advanced Concepts and Formulation Office, are driving this requirement, with some JWST-follow on concepts requiring onboard signal acquisition and processing in the Terahertz regeime. Future telescopes, broadband spectrometers, radar, radiometers, and lidar digitizers are all instrument classes that are encompassed in this staggering requirement. To address the issue for both near-term and long-term instrumentation, COMP-X is proposed as a broadband signal processing platform that serves as the starting point for development of a common-hardware approach to serve multiple applications in a re-programmable fashion.

Anticipated Benefits

This project matures several mission concepts by developing COMP-X as a key enabling technology that is both scalable and optimized for the mission in the long-term. COMP-X is an electronics card featuring programmable digital logic and new signal converter technology that will achieve signal generation and capture up to 4 GHz in bandwidth. This card will be the development platform used to prepare the digital logic for detector readout, which will then be migrated to an application specific integrated circuit (ASIC) in a larger-future development effort that will leverage SBIR and NASA SMD research resources. The anticipated benefit is a prototyping platform that allows wideband instrument signal processing systems to be developed in preparation for ASIC migration and implementation where there is a definite advantage in overall SWaP for the instrument.



Functional Block Diagram of Comp-X

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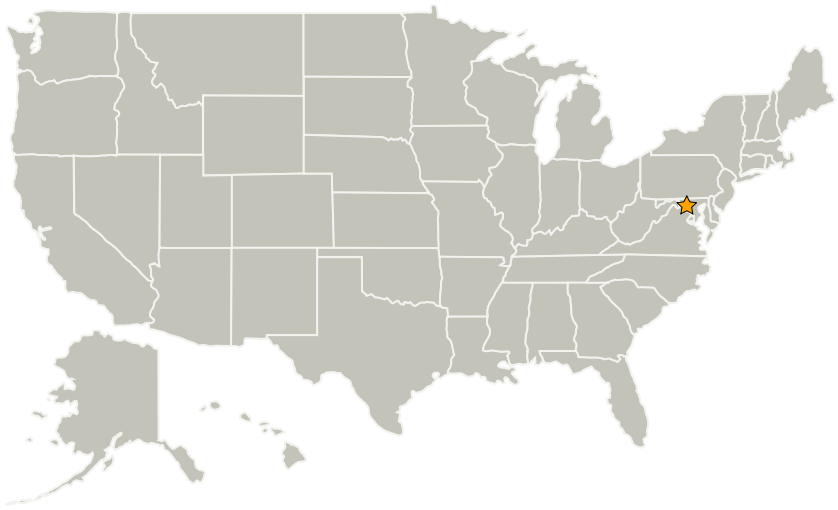
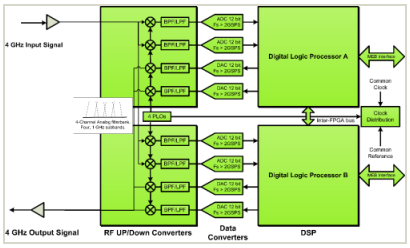
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Images



Functional block diagram
Functional Block Diagram of Comp-X
(https://techport.nasa.gov/image/28333)

Organizational Responsibility

Responsible Mission Directorate:
Mission Support Directorate (MSD)

Lead Center / Facility:
Goddard Space Flight Center (GSFC)

Responsible Program:
Center Independent Research & Development: GSFC IRAD

Project Management

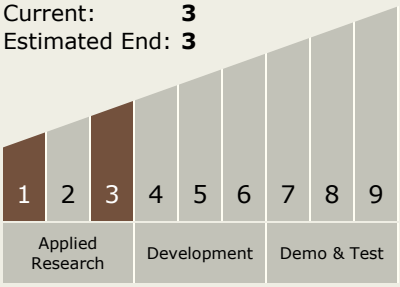
Program Manager:
Peter M Hughes

Project Managers:
Wesley A Powell
Michael A Johnson

Principal Investigator:
Damon C Bradley

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

Earth, Mars, Others Inside the Solar System

Supported Mission Type

Projected Mission (Pull)